TRUSTED DATA HAULING BY CO-OPERATIVE SPECTRUM SENSING (CSS) IN COGNITIVE RADIO NETWORK

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Abstract - In CSS, there are many energy efficient traditional methods are their but it doesn’t bother about Network security. Hence we proposed an Energy Efficient Collaborative Spectrum Sensing (EECSS) Protocol based on Trust and Reputation Management (TRM) Unit to combat malicious behavior. TRM unit calculates Trust value for each Secondary user’s (SU’s) and find out and drops them from the network. By this way we prove that network security is enabled in our model. Energy Consumption is the major problem in Traditional CSS method, due to more number of sensing reports exchanged. In our proposed method we are using Data Fusion scheme to reduce total number of sensing reports exchanged between secondary user’s base station and SU’s i.e. energy consumption was reduced.

Key Words: Cognitive Radio Network, Co-operative Spectrum Sensing, Data Fusion, Trust and Reputation Management Unit, Spectrum Sensing

1. INTRODUCTION

Cognitive Radio (CR) has been proposed as a solution to destroy Radio Spectrum Scarcity. In CRN communication devices changes its transmission and reception parameters for efficient utilization of spectrum this is called as Dynamic Spectrum Access. In CRN, Secondary users (SU) can sense unused licensed spectrum band. Important activity of CRN is to allocate unused spectrum holes to SU without providing interference to Primary users. Spectrum Sensing is the method used to detect the unused spectrum and sharing it. Cooperative spectrum sensing (CSS) has been proposed in which sensing reports are coming up with few decision making authorities to ensure about reliable decision on the state of spectrum usage. However in the presence of malicious SU’s integrity of report need to be checked to avoid interference. Hence Trust and Reputation Management unit is used it is not only used to combat the malicious behavior, it ensures that there is no link disconnection in the network. Since the network is coming up with few decision authorities there is no secondary users loose the chance to utilize the spectrum when they are within the range of CRN simultaneously malicious nodes are avoided to sense the spectrum. Including decision making authorities in the cognitive radio network reduces the energy consumption. Reduction of total number of sensing report is our main objective this will be achieved by using the proposed protocol. There are some spectrum sensing techniques are there which are just used to allocate the unused spectrum holes hence we including few decision making authorities in the network to produce the efficacious and trusted communication.

2. SYSTEM MODEL

Here we are using H-Honest secondary users (HSU) and one Primary user base station (PUBS) and secondary user base station (SUBS) and three primary users (PU). Here SUBS and PUBS base stations are communicated so that PUBS conveys State Band Matrix (SBM) which includes the state of the licensed band. Here Fusion Centre (SUBS) requests all SU to sense one band. BSM allows FC to calculate accuracy of its report in addition with the report from SU’s. The System model was gonna run in NS2 Software.

3. PROPOSED WORK CODINGS

# Define options
set val(chan) Channel/WirelessChannel ; # channel type
set val(prop) Propagation/TwoRayGround ; # radio-propagation model
set val(netif) Phy/WirelessPhy ; # network interface type
set val(mac) Mac/802_11 ; # MAC type
set val(ifq) Queue/DropTail/PriQueue ; # interface queue type
set val(ll) LL ; # link layer type
set val(ant) Antenna/OmniAntenna ; # antenna model
set val(ifqlen) 30 ; # max packet in ifq
set val(nn) 15 ; # number of mobilenodes
set val(rp) AODV ; # routing protocol
set val(x) 1000 ; # X dimension of topography
set val(y) 1000 ; # Y dimension of topography
set val(stop) 150 ; # time of simulation end
set ns [new Simulator]
set tracefd [open simple.tr w]
set namtrace [open simwrls.nam w]
$ns trace-all Stracefd
$ns namtrace-all-wireless $namtrace $val(x) $val(y)
# set up topography object
set topo [new Topography]
$topo load_flatgrid $val(x) $val(y)
create-god $val(nn)
# configure the nodes

$ns node-config -adhocRouting $val(rp) \\
-lIType $val(ll) \\
-macType $val(mac) \\
-ifqType $val(ifq) \\
-ifqLen $val(ifqlen) \\
-antType $val(ant) \\
-propType $val(prop) \\
-phyType $val(netif) \\
-topoInstance $topo \\
-agentTrace ON \\
-routerTrace ON \\
-macTrace OFF \\
-movementTrace ON

for {set i 0} {i < $val(nn)} {incr i} {
    set n($i) [new Agent] 
    set n($i) [new Location] $i
    set n($i) [new Channel]
    set n($i) [new Agent] $i
    set n($i) [new Location] $i
    set n($i) [new Channel]
}

$n(7) set X_10.0
$n(7) set Y_15.5
$n(8) set X_48.0
$n(8) set Y_85.0
$n(9) set X_54.0
$n(9) set Y_225.0
$n(10) set X_60.0
$n(10) set Y_345.0
$n(11) set X_66.0
$n(11) set Y_535.0
$n(12) set X_72.0
$n(12) set Y_705.0
$n(13) set X_78.0
$n(13) set Y_435.0
$n(13) set Z_0.0
$n(14) set X_84.0
$n(14) set Y_235.0
$n(14) set Z_0.0
$n(15) set X_120.0
$n(15) set Y_25.0
$n(15) set Z_0.0
$n(16) set X_180.0
$n(16) set Y_95.0
$n(16) set Z_0.0
$n(17) set X_240.0
$n(17) set Y_5.0
$n(17) set Z_0.0
$n(18) set X_300.0
$n(18) set Y_125.0
$n(18) set Z_0.0
$n(19) set X_360.0
$n(19) set Y_15.0
$n(19) set Z_0.0
$n(20) set X_420.0
$n(20) set Y_155.0
$n(20) set Z_0.0
$n(21) set X_480.0
$n(21) set Y_85.0
$n(21) set Z_0.0
$n(22) set X_540.0
$n(22) set Y_225.0
$n(22) set Z_0.0
$n(23) set X_600.0
$n(23) set Y_345.0
$n(23) set Z_0.0
$n(24) set X_660.0
$n(24) set Y_535.0
$n(24) set Z_0.0
$n(25) set X_720.0
$n(25) set Y_705.0
$n(25) set Z_0.0
$n(26) set X_780.0
$n(26) set Y_435.0
$n(26) set Z_0.0
$n(27) set X_840.0
$n(27) set Y_235.0
$n(27) set Z_0.0
$n(28) set X_900.0
$n(28) set Y_345.0
$n(28) set Z_0.0
$n(29) set X_960.0
$n(29) set Y_535.0
$n(29) set Z_0.0
$n(30) set X_1020.0
$n(30) set Y_705.0
$n(30) set Z_0.0
$n(31) set X_1080.0
$n(31) set Y_435.0
$n(31) set Z_0.0
$n(32) set X_1140.0
$n(32) set Y_235.0
$n(32) set Z_0.0
$n(33) set X_1200.0
$n(33) set Y_345.0
$n(33) set Z_0.0
$n(34) set X_1260.0
$n(34) set Y_535.0
$n(34) set Z_0.0
$n(35) set X_1320.0
$n(35) set Y_705.0
$n(35) set Z_0.0
$n(36) set X_1380.0
$n(36) set Y_435.0
$n(36) set Z_0.0
$n(37) set X_1440.0
$n(37) set Y_235.0
$n(37) set Z_0.0

$ns at 10.0 "$n(12) setdest 600.0 703.0 15.0"
$ns at 11.0 "$n(13) setdest 790.0 710.0 15.0"
$ns at 15.0 "$n(8) setdest 780.0 85.0 15.0"
$ns at 18.0 "$n(10) setdest 780.0 345.0 15.0"
$ns at 20.0 "$n(9) setdest 590.0 223.0 18.0"
$ns at 22.0 "$n(4) setdest 6.0 102.0 27.0"
$ns at 23.0 "$n(3) setdest 55.0 152.0 17.0"

# Set a TCP connection and send data between n(4) and n(1)

set tcp [new Agent/TCP/Newreno]
$tcp set class_ 2
set sink [new Agent/TCPSink]
$ns attach-agent $n(4) $tcp
$ns attach-agent $n(1) $sink
$ns connect $tcp $sink
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ns at 25.0 "$ftp start"
$ns at 35.0 "$ftp stop"
# Set a Data between n(1) and n(6)
set tcp [new Agent_TCP/Newreno]
$tcp set class_2
set sink [new Agent_TCPSink]
$ns attach-agent $n(1) $tcp
$ns attach-agent $n(6) $sink
$ns connect $tcp $sink
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ns at 43.0 "$ftp start"
$ns at 59.0 "$ftp stop"
# Set a Data between n(6) and n(9)
set tcp [new Agent_TCP/Newreno]
$tcp set class_2
set sink [new Agent_TCPSink]
$ns attach-agent $n(6) $tcp
$ns attach-agent $n(9) $sink
$ns connect $tcp $sink
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ns at 60.0 "$ftp start"
$ns at 85.0 "$ftp stop"
# Send data between n(9) and n(11)
set tcp [new Agent_TCP/Newreno]
$tcp set class_2
set sink [new Agent_TCPSink]
$ns attach-agent $n(9) $tcp
$ns attach-agent $n(11) $sink
$ns connect $tcp $sink
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ns at 88.0 "$ftp start"
$ns at 100.0 "$ftp stop"
$ns flush-trace
close $tracefd
close $namtrace
exec nam simwrls.nam &
}
$ns run

4. CONCLUSION

Empirical Analysis without Malicious node is performed and the result is generated which shows that the Energy consumption in EE-CSS protocol is reduced based on Performance delay which shows that the number of sensing reports exchanged between secondary users and its base station was reduced. Hence without including malicious node we had reduced total number of sensing reports exchanged than traditional one, which shows this proposed method is more energy efficient. This work proves authentication and there is no link breakage in the network hence requested secondary user’s spectrum utilization was going correct which will be user-friendly part of our work.

REFERENCES


